SECONDARY SCHOOL ANNUAL EXAMINATIONS 2011

Directorate for Quality and Standards in Education
Educational Assessment Unit

F

FORM 5 **MATHEMATICS SCHEME A** **TIME: 20 minutes**

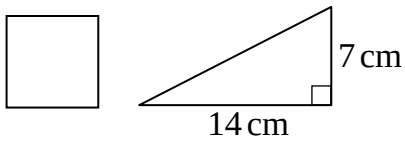
Non Calculator Paper

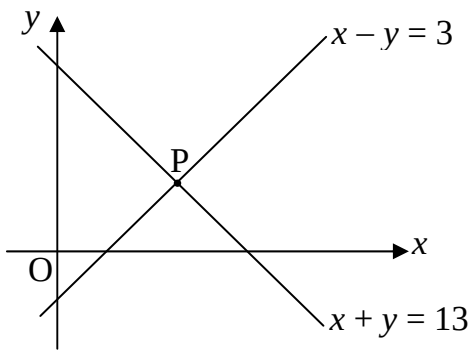
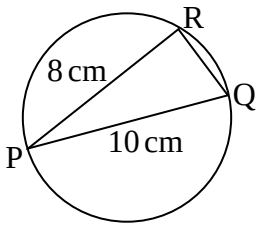
Name: _____ **Class:** _____

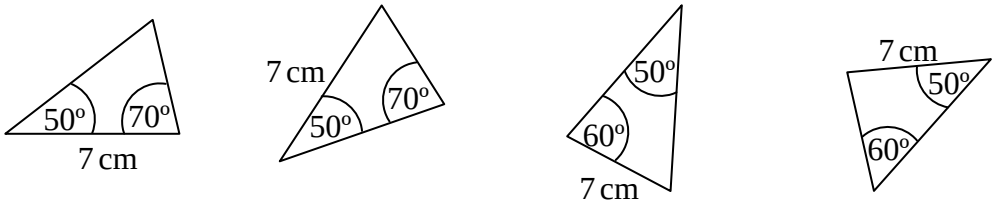
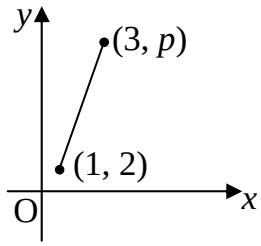
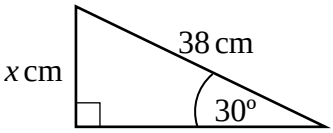
Mark

INSTRUCTIONS TO CANDIDATES

- **Answer all questions.**
- **This paper carries a total of 20 marks.**
- **Calculators and protractors are NOT allowed.**

No.	Question	Space for Working
1	Evaluate $250 + 75 \times 4$. **Answer: _____**	
2	€125 are shared between 2 people in the ratio of 4 **:** 1. What is the **larger** share? **Answer: €_____**	
3	A student scored $\frac{17}{25}$ in a Mathematics test. What was his **percentage** mark? **Answer: _____%**	
4	Given that $f(x) = 5x - 3$ and $f(x) = 32$, find the value of x. **Answer: _____**	
5	The area of the square is **equal** to the area of the triangle. What is the length of one side of the square?  **Answer: _____ cm**	
6	The turtle starts at the position shown. Make a sketch of what the turtle draws to satisfy these LOGO commands. PD FD 60 LT 90 FD 120 RT 90 FD 60	
7	Write down the value of 0.2^2. **Answer: _____**	

No.	Question	Space for Work
8	A bank pays an annual interest of 1% on a savings account. What is the interest paid in 1 year on €4000? **Answer: € _____**	
9	Write down the x coordinate of the point P.  **Answer: _____**	
10	A sequence of numbers begins: 7, 10, 13, 16, … Which **one** of the following is a member of the sequence? A) 45 B) 46 C) 47 D) 48 **Answer: _____**	
11	Evaluate $\frac{1}{2}$ of $\left(\frac{2}{3}+\frac{1}{4}\right)$. **Answer: _____**	
12	Work out $(2.3 \times 10^5) \times (4 \times 10^7)$, giving your answer in **standard form**. **Answer: _____**	
13	 The diameter PQ of the circle is 10 cm and PR is 8 cm. Write down the length of RQ. **Answer: _____ cm**	

No.	Question	Space for Work
14	The **sum** of two whole numbers is 24. The **range** of the numbers is 6. What is the **smaller** number? **Answer: _____**	
15	Write down the value of $3 \times 7.5 - 2 \times 7.5$. **Answer: _____**	
16	Which **two** of the triangles **sketched** below are congruent? Underline the correct reason for your answer.  A) B) C) D) **Answer: ____ and ____ ; Reason: SSS SAS ASA RHS**	
17	 The gradient of the line joining the points (1, 2) and (3, p) is 3. Find the value of p. **Answer: _____**	
18	 Given that $\sin 30^\circ = \frac{1}{2}$, write down the value of x. **Answer: _____**	
19	Given that $2^x = \frac{1}{16}$, write down the value of x. **Answer: _____**	
20	Write down the value of $\sqrt{3}\left(\sqrt{12} - \sqrt{3}\right)$. **Answer: _____**	

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FORM 5 **MATHEMATICS SCHEME A** **TIME: 1h 40min**
Main Paper

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	Total Main	Non Calc	**Global Mark**
Mark																

DO NOT WRITE ABOVE THIS LINE

Name _____ **Class** _____

CALCULATORS ARE ALLOWED BUT ALL NECESSARY WORKING MUST BE SHOWN.
ANSWER ALL QUESTIONS.

1. (a) In 2010 the school population was 850. In 2011 the school population decreased to 782. Work out the **percentage decrease**.

Percentage decrease = _____ %

(b) The price of a pair of shoes in a shop in December was € 80.
In January the shop reduced the price by 20%.
In February the shop reduced the **January** price by a further 20%.
Work out the price of the pair of shoes in **February**.

Price in February = € _____

_____(4 marks)

2. Solve the simultaneous equations:

$y = x + 2$

$y = x^2 - 4$

x = _____, y = _____

or x = _____, y = _____

(5 marks)

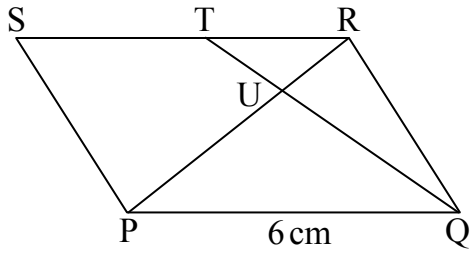
3. 

Diagram NOT to scale

PQRS is a parallelogram.

ST is **twice** as long as TR.

PQ = 6 cm.

(a) Explain why triangles TUR and QUP must be **similar**.
Give reasons.

(b) Write down the length of TR.

TR = _____ cm

(c) Write down the ratio $\frac{\text{TR}}{\text{QP}}$ in it **simplest** form.

Ratio $\frac{\text{TR}}{\text{QP}}$ = _____

(d) Write down the ratio $\frac{\text{Area of triangle TUR}}{\text{Area of triangle QUP}}$ in it **simplest** form.

Ratio $\frac{\text{Area of } \Delta \text{TUR}}{\text{Area of } \Delta \text{QUP}}$ = _____

(6 marks)

Name: _____ Class: _____

4. George used a spreadsheet to keep a record of his car's annual running costs in 2010.

	A	B
1	Road Licence (€)	127.00
2	Insurance (€)	178.26
3	VRT (€)	20.27
4	Amount Spent on Petrol Annually (€)	1056.00
5	Amount Spent on Servicing Annually (€)	325.00
6	TOTAL Amount Spent Annually (€)	
7	Number of km Travelled Annually	9600.00
8	Cost of 100 km Travelled in 2010 (€)	

(a) What formula did George type in cell **B6**?

= _____

(b) What number did George obtain in cell **B6**?

_____

(c) What formula did George type in cell **B8**?

= _____

(d) What number did George obtain in cell **B8**?

_____

_____(4 marks)

5. The formula $C = \frac{5}{9}(F - 32)$ can be used to change temperatures from degrees Celsius (º*C*) to degrees Fahrenheit (º*F*).

(a) On a very hot day in August the temperature was given as 104º*F*.
Use the formula to work out the temperature in degrees Celsius (º*C*).

_____ ***ºC***

(b) Make *F* the subject of the formula.

F = _____

(c) The temperature at which petrol boils is given as 95º*C*.
What is this temperature in degrees Fahrenheit (º*F*)?

_____ ***ºF***

_____(6 marks)

6. A boat sails 16.2 km from Ġ (Ġnejna Bay), on a bearing of 305º, to a point S.
It then changes direction and sails 3.8 km towards X (Xlendi Bay).
Angle ĠSX is a right angle.

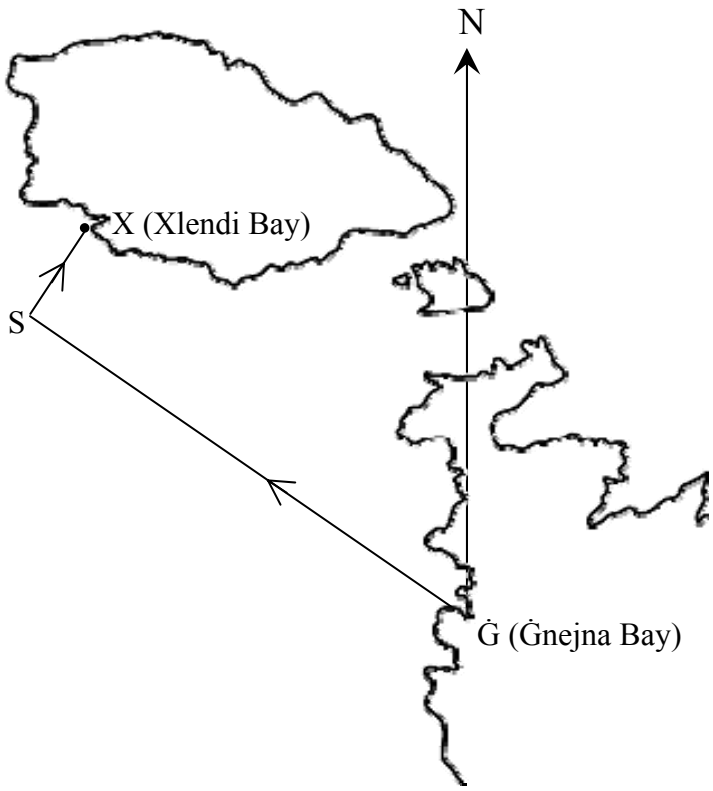


Diagram NOT to scale

Work out:

(a) The distance ĠX, correct to **1 decimal place**.

ĠX = _____ km

(b) The bearing of X from Ġ, correct to **the nearest degree**.

Bearing of X from Ġ = _____ º

_____(5 marks)

Name: _____ Class: _____

7. John has a room with a floor area of $36\,m^2$. He wants to tile the floor of the room. He has a choice of different tiles which are all **square**.

   The tiles are of length L metres. The number of tiles needed is N.

   (a) Write down a formula connecting N and L, with N as subject.

   $N =$ _____

   (b) Which **one** of the following describes the relationship between the number of tiles needed, N, and the length of the tile, L?

   P) N is directly proportional to the length L of the tile.

   Q) N is inversely proportional to the square of the length L of the tile.

   R) N is inversely proportional to the length L of the tile.

   S) N is directly proportional to the square of the length L of the tile.

   _____

   (c) Work out the number of tiles needed when $L = 0.4\,m$

   Number of tiles needed = _____

   (d) Work out the length of the tile, in **metres**, when 100 tiles are needed.

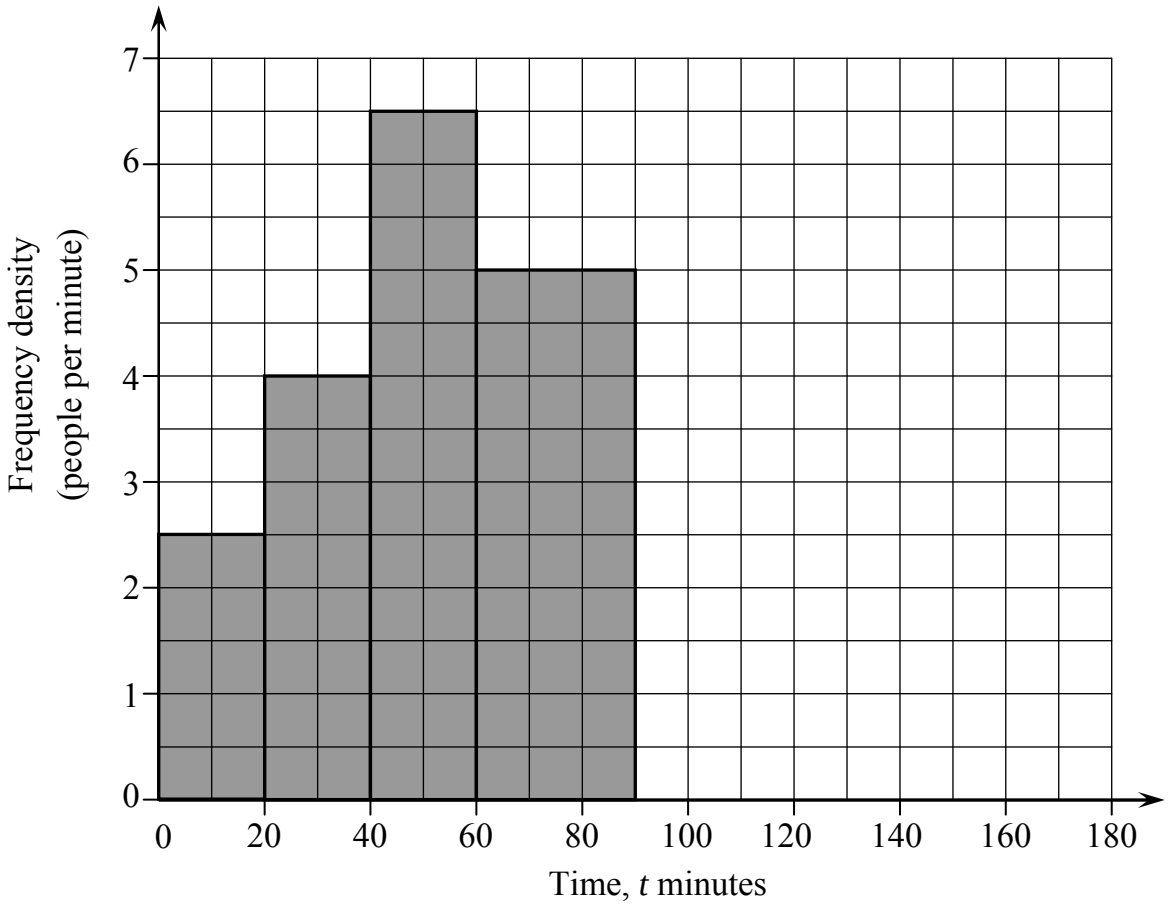
   Length of the tile = _____ m

_____(6 marks)

8. The table and histogram show information about the waiting times at the Acci
Emergency Department in a hospital one day.

Use the information to complete the table and the histogram.

Time, t minutes	Frequency	Frequency Density
$0 < t \leq 20$	50	2.5
$20 < t \leq 40$		
$40 < t \leq 60$	130	
$60 < t \leq 90$		
$90 < t \leq 120$	45	
$120 < t \leq 180$	30	



(7 marks)

9. Solve $\frac{x+2}{x+3} = \frac{2x-3}{3x-7}$.

$x =$ _____, _____

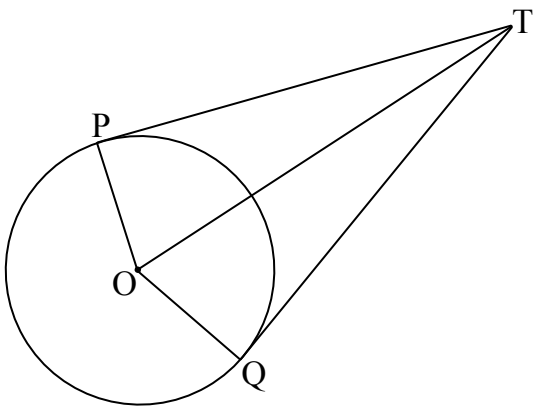
_____(6 marks)

10. (a) In the diagram TP and TQ are tangents to the circle centre O.

Use congruent triangles to prove that TP = TQ.

(The two tangents from a point outside a circle are equal in length).

Give reasons for your answers.

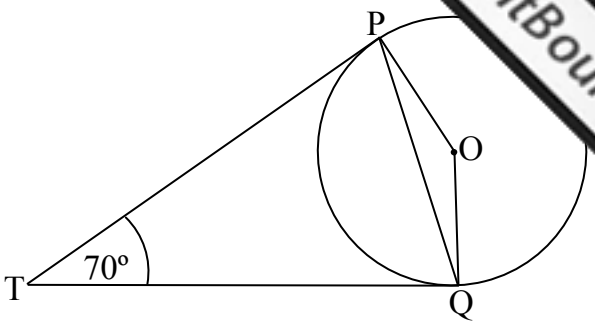


10. (b) In the diagram TP and TQ are tangents to the circle centre O.

Angle PTQ = 70º.

Work out the size of angle OPQ.

Give reasons for your answers.



Angle OPQ = _____

_____(8 marks)

11. (a) Given that f(x) = 5x – 3:

(i) Evaluate f(3).

f(3) = _____

(ii) Write down $f^{-1}(x)$.

$f^{-1}(x)$ = _____

(b) Given that y = f(x – 1)

find the value of y when x = 3.

y **= _____**

(c) Which **one** of the following gives the rule for y in terms of x?

P) $y = 5x - 4$ Q) $y = 4x - 2$ R) $y = 5x - 8$ S) $y = 6x - 4$

_____

_____(6 marks)

12. (a) Complete the table for $y = \frac{4}{x}$ for the given values of x.

x	-4	-2	-1	-0.5	0.5	1	2	4
y	-1	-2		-8		4		

(b) Draw the graph of $y = \frac{4}{x}$ for x from -4 to 4.

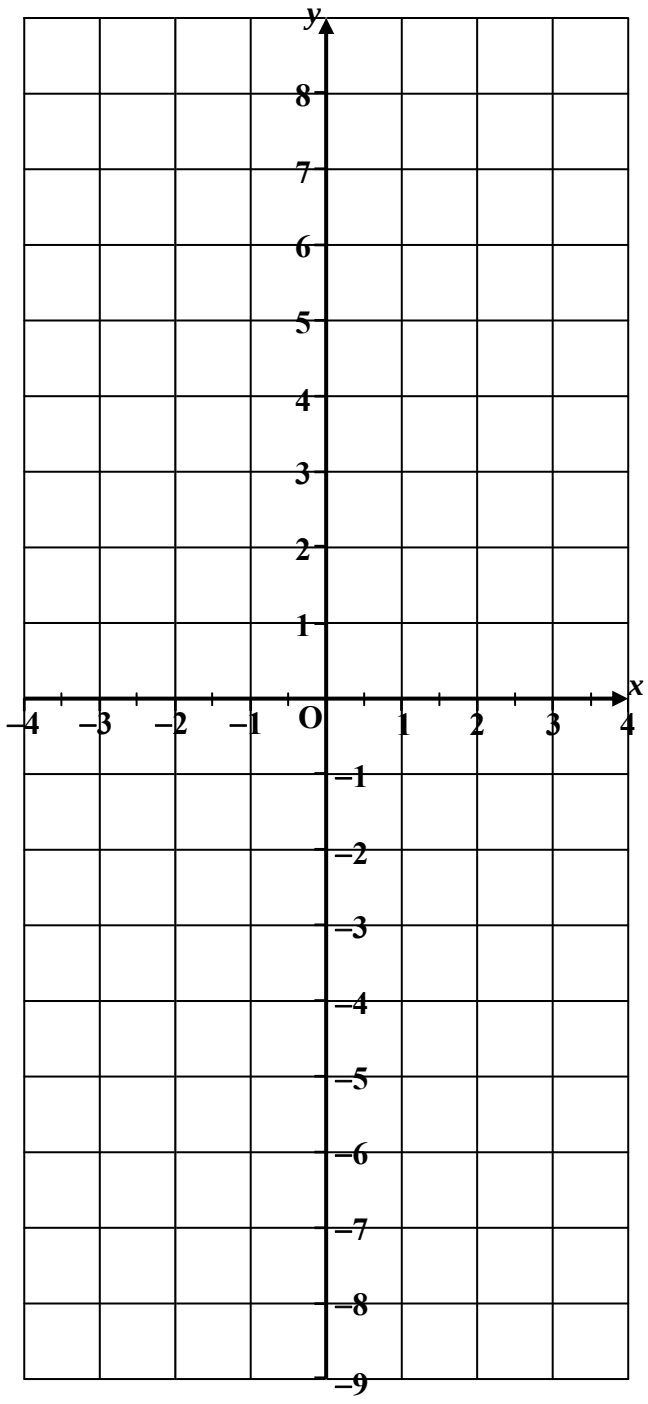
(c) On the same axes draw the graph of $y = x + 1$.

(d) From your graphs write down an estimate, correct to **one decimal place**, for the **positive** solution of $\frac{4}{x} = x + 1$.

x = _____

(e) *In this part of the question use your answer to* (*d*).

Use the method of trial and improvement to give an estimate for the **positive solution** to $\frac{4}{x} - x = 1$, correct to **two decimal places**. (Show all your working).



x = _____

(8 marks)

13. The following question is about the results of a survey on the use of the inter
students aged 7 to11 years and students aged **12 to 16 years**.

(a) The table below shows information about the number of hours spent per week on the internet by students aged **12 to 16 years** and the percentage of students.

Number of hours (h)	$0<h\leq 2$	$2<h\leq 4$	$4<h\leq 6$	$6<h\leq 8$	$8<h\leq 10$	$10<h\leq 12$
Frequency %	20	18	13	11	12	26

Complete the following **cumulative frequency** table:

Number of hours (h)	$h\leq 2$	$h\leq 4$	$h\leq 6$	$h\leq 8$	$h\leq 10$	$h\leq 12$
Cumulative frequency %	20					100

(b) Use the grid on the next page and your answers to part (a) to draw the cumulative frequency curve for students aged **12 to 16 years**.

(c) Use the curve drawn in part (b) to estimate:

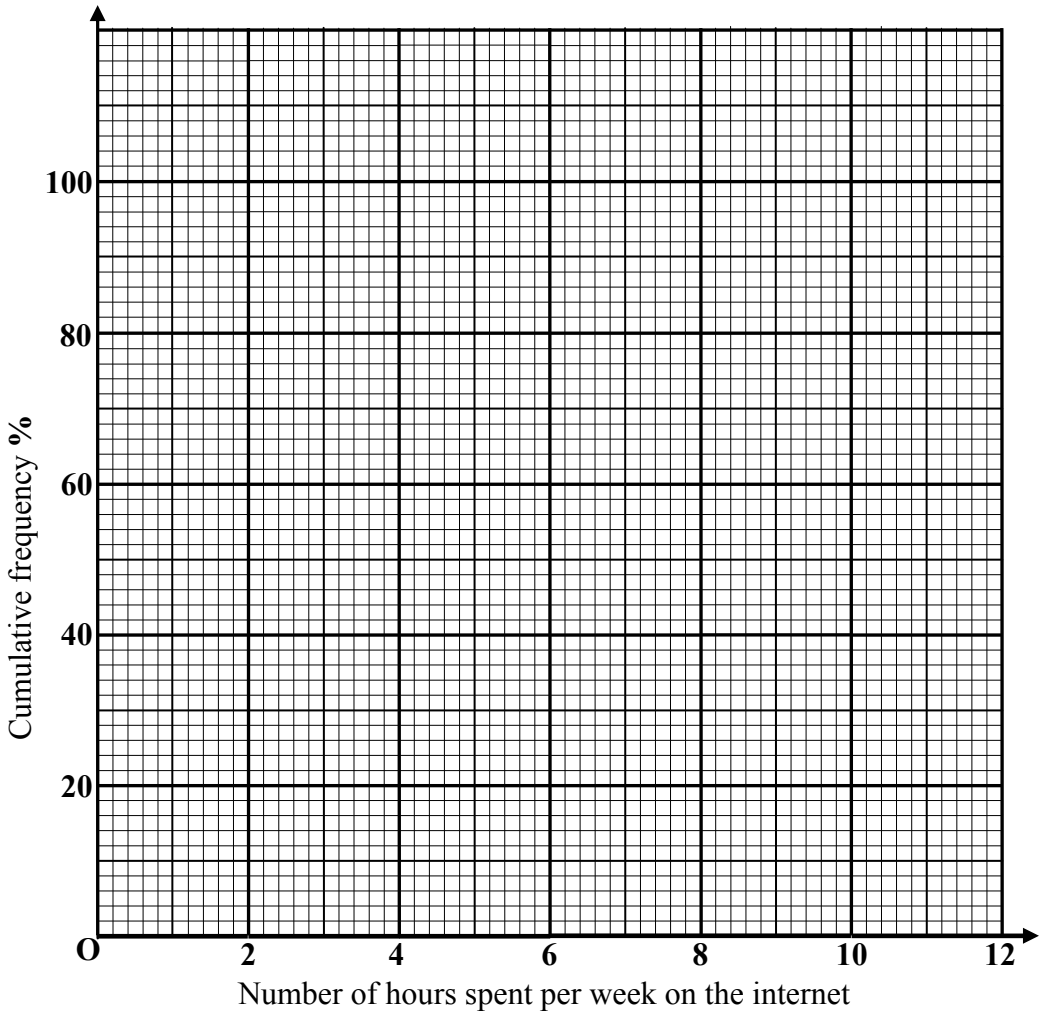
(i) the **median** number of **hours** of internet use for students aged **12 to 16 years**, correct to **one decimal place**.

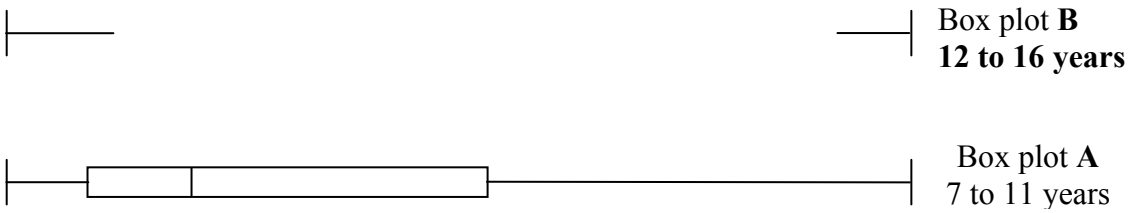
_____ **hours**

(ii) the **interquartile range** of the number of **hours** of internet use for students aged **12 to 16 years**, correct to **one decimal place**.

_____ **hours**

(d) Complete box plot **B** to illustrate the distribution of the number of hours of internet use for students aged **12 to 16 years**.





(e) Box plot **A** illustrates the distribution of the number of hours of internet use for students aged 7 to 11 years.

The report on the survey states that "internet use varies with age".

Which age group makes most use of the internet? Explain your answer.

The information in this question is adapted from information given by the National Statistics Office - Malta in the Survey On The Use Of The Internet By Students

(9 marks)

END OF PAPER

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